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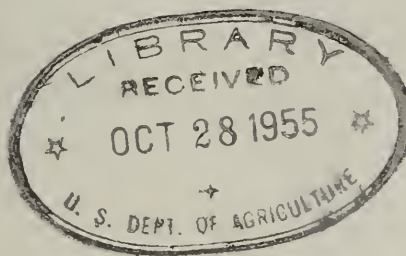
RESEARCH CONFERENCE

on

CONDITIONING and STORAGE

of

RICE,



Beaumont, Texas

June 6, 1949 //

REGISTRY

<u>Name</u>	<u>Address</u>	<u>Division Represented</u>
Earl R. Glover	Washington, D. C.	PMA
W. G. Taggart	Baton Rouge, La.	Louisiana Agri. Expt. Station
R. Y. Winters	Washington, D. C.	USDA, Agri. Research Admn.
B. R. Hill	New Orleans, La.	Southern Regional Research Laboratory
A. M. Altschul	New Orleans, La.	Southern Regional Research Laboratory
R. M. Weihing	Beaumont, Texas	Rice-Pasture Expt. Station
R. K. Walker	Crowley, La.	Rice Experiment Station
R. H. Wyche	Beaumont, Texas	Rice-Pasture Expt. Station
L. George Coonrod	Crowley, La.	Rice Experiment Station
Harold T. Barr	Baton Rouge, La.	Louisiana Agri. Expt. Station
Art Cummings	Washington, D. C.	Grain Branch - PMA
C. M. Packard	Washington 25, D. C.	USDA - Bureau of Entomology & Plant Quarantine
J. Dewey Long	Beltsville, Maryland	USDA. Div. Agri. Engineering
William V. Hukill	Ames, Iowa	BPISAE - Agricultural Engr.
Wayne J. McIlrath	College Station, Texas	Tex. Agri. Experiment Station
H. G. Johnston	College Station, Texas	Dept. of Entomology
Jack Bradshaw	College Station, Texas	State Office, PMA
J. R. Adams	College Station, Texas	State Committee - PMA
H. F. Miller	College Station, Texas	Tex. Agri. Experiment Station
J. W. Sorenson, Jr.	College Station, Texas	Tex. Agri. Experiment Station
J. C. Dishman	Beaumont, Texas	Texas Rice Improvement Assn.
Fred L. Aldred	Beaumont, Texas	Rice-Pasture Expt. Station
Kyle Engler	Fayetteville, Arkansas	University of Arkansas
Harold A. Kramer	Beaumont, Texas	Rice-Pasture Expt. Station
Truman E. Hienton	Beltsville, Maryland	BPISAE - Div. of Farm Electrification
H. M. Beachell	Beaumont, Texas	Rice-Pasture Expt. Station
Kirby McGown	Beaumont, Texas	Security State Bank & Trust Company
John Kimberley	Washington, D. C.	Grain Branch - PMA
L. A. Mullin	Baton Rouge, La.	PMA
W. C. Davis	Beaumont, Texas	Rice-Pasture Expt. Station
R. D. Lewis	College Station, Texas	Tex. Agri. Expt. Station
A. H. Boyt	Beaumont, Texas	Am. Rice Growers Coop. Assn.

RICE STORAGE CONFERENCE

A Rice Storage Conference was held in Beaumont, Texas, on June 6, 1949, with Director R. D. Lewis of the Texas Agricultural Experiment Station presiding as chairman. The following is a summary of the comments, suggestions, and actions taken by the group together with a listing of the registered attendance.

After announcements, and introduction of representatives, Director Lewis gave a brief summary of the purpose of the meeting.

Brief reports were then presented on A. Research (1) done, (2) in progress, (3) contemplated and needed.

B. Organization and facilities for research

By: J. W. Sorenson, Texas Agricultural Experiment Station

H. T. Barr, Louisiana Agricultural Experiment Station

Kyle Engler, Arkansas Agricultural Experiment Station

A. M. Altschul, Southern Regional Research Laboratory

H. A. Kramer, Division of Farm Buildings and Housing, BPISAE

C. M. Packard, Bureau of Entomology & Plant Quarantine

Art Cummings, Commodity Research Division, Production and Marketing Administration

The reports or summaries thereof are attached.

At 10:00 a.m. the group made a trip to the Rice-Pasture Experiment Station, a cooperative agency of the Texas Agricultural Experiment Station, Bureau of Plant Industry, Soils, and Agricultural Engineering, and the Texas Rice Improvement Association.

At 12:00 p.m. the members of the conference attended a group luncheon given by the Farm and Ranch Club of Beaumont, Texas, and the Chamber of Commerce in the Crystal Room of the Edson Hotel.

SUMMARY OF RICE DRYING STUDIES CONDUCTED BY TEXAS AGRICULTURAL EXPERIMENT STATION

by

J. W. Sorenson, Jr.

Rice drying studies were started by the Texas Agricultural Experiment Station in 1944. In November and December of that year a total of 152 sacks (24,620 pounds dry weight) were dried in three tests. The tests were made on the W. A. Frasier farm near Houston with a lateral type hay dryer, modified so that rice could be dried in sacks. The rice was dried from an average of 19.2 percent moisture to 13 percent with an average air temperature in the system below the sacks of 103° F. The drying time averaged eight hours with the cost of fuel and power averaging 5.6 cents per barrel or 69.2 cents per ton.

In 1946 a tunnel-type drier was built on the experiment station farm at Beaumont. A total of 3619 sacks of rice (542,000 pounds dry weight) were dried with this unit during the 1946 season. The rice was dried from an average of 19 percent moisture to 12.5 percent with an average air temperature in the tunnel of 118° F. The average drying time was eight hours with a cost of 4.01 cents per barrel or 49.5 cents per ton. The report on this operation is given in Progress Report 1070, "Hay and Grain Drying - 1946."

In 1947 a series of tests were started at the Beaumont Station to determine the effect of the drying air temperature and the initial moisture content of the grain on the milling quality and germination. The tunnel-type drier mentioned previously was used to dry the rice.

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The procedure used in conducting these tests was as follows: bags of rice were obtained having moisture contents ranging from 15 to 28 percent. The rice was then dried with heated air at temperatures ranging from 105° to 200° F. At the end of the drying period, samples were taken from the bottom, center and top of each sack for each test made. Moisture tests were made from part of these samples and the remainder used for germination and milling tests.

The results of these tests show that a drying air temperature of 140° F. has no detrimental effect on germination for rice with 15 percent moisture or lower. The germination was not impaired when rice with 15 to 20 percent moisture was dried with an air temperature of 125° F. There was a significant reduction in germination, however, when rice above this moisture range was dried with an air temperature above 120° F.

The milling yields of head rice were greatly reduced for all ranges of moisture when the drying air temperature was higher than 125° F. There was no marked reduction in milling yields, however, when rice with 15 percent moisture or lower was dried with an air temperature of 125° F. On the other hand, the milling quality of rice with 15 to 20 percent moisture was lowered by using an air temperature higher than 115° F. These tests also indicate that the milling yields are reduced when rice above 20 percent moisture is dried with an air temperature above 105° F.

A detailed description of the procedure used is given in Progress Report 1138, "Drying Rice in Sacks." The above results are based on both the 1947 and 1948 tests, however.

BRIEF REPORT

RICE DRYING AND STORAGE

Research Needed

We all realize that much remains to be done on all phases of research relating to drying and storage of rice. It is with this thought in mind that the following suggestions for research needed are given.

DRYING

- (1) The practicability of using high humidity air during the first part of the drying operation to heat the rice before much surface evaporation occurs. Then, reduce the humidity to allow the moisture to be removed without the outer surface sealing and thus preventing case-hardening.
- (2) Relation of temperature, air volume and humidity to rate of drying.
- (3) Optimum thickness of column in bulk driers.
- (4) Effect of different methods of drying rough rice of different varieties.
- (5) Size of opening for sack driers to obtain the best air distribution through the sack.
- (6) Labor saving machinery for loading and unloading sack driers.

STORAGE

- (1) The effect of chemicals in preventing heating and deterioration during storage and the effect of these chemicals on the germination of the seed.
- (2) Barrelage costs on different types of construction.
- (3) Proper size of bins and materials used for construction.
- (4) Arrangement of bins.

BRIEF REPORT
by
Harold T. Barr
Louisiana Agricultural Experiment Station

Work was started by the Agricultural Engineering Department of Louisiana State University some nine years ago in the various phases of harvesting, drying, and storage. The work has been under the immediate supervision of Messrs. Kramer, Morgan, and Bond at different stages. We are now in the process of dividing the work for the future between the Rice Experiment Station at Crowley and the Baton Rouge Station, with Agricultural Engineers, Agronomists, Pathologists, Entomologists, Plant Breeders, and Food Nutritionists each involved for their part.

In the past we have studied air-flow through various rice columns, pressure on bin walls, and bin floors by rice both in a small laboratory unit and full size bine, combine damage, binder twine materials, and rice sack materials.

Two one-fourth scale driers and three one-combine capacity driers have been built and the latter used in drying rice, oats, grass, and clover seeds. The rice farmers are in need of grass and clover seeds in co-ordination with the rice crop in order to carry out the improved pasture program. They can best get the seed by growing it locally and properly drying it.

Eight commercial companies are now fabricating rice driers on the L. S. U. drier design, with only minor changes in design.

During 1947 and 1948 cost and operation studies were carried out on full scale driers.

One drier was run at a temperature much above previous advised maximum temperature for drying and a premium was paid on this rice, indicating there is still more to be found out about temperatures, time of exposure and quality.

A vacuum drier of 10 barrel capacity was operated on 19% green rice with success and gave a rice of superior milling and excellent germination. However, the cost of operation was very high as compared to atmospheric air driers.

A forage crop drier was also tried out with three batches of 19, 20 and 20 1/2 per cent moisture. This gave a low milling quality rice and only fair germination.

We feel that there is still more to be found out about moisture removal, germination, physiological, and cooking qualities. What causes the so-called case-hardening of rice?

We expect to enter the field immediately in cooperation with the USDA-BPISAE on high frequency drying of rice and what effects this has on the physical make-up of the rice grain, the entomological and pathological controls, etc. - what frequencies are required to carry out these above factors and for what periods of time? Frequencies of 3, 6, 13, 26, and 40 thousand mega cycles will be used in this work.

BRIEF REPORT
by
Kyle Engler
University of Arkansas

Rice drying research was started at the Arkansas Experiment Station in 1941. First work was done by Professor E. L. Barger, Arthur Thompson, and Kyle Engler, in developing a farm size rice drier. In 1944 preliminary work was done in tying together factors determining drying rates with milling quality and germination. These results are to be published in the near future as an Arkansas Experiment Station Bulletin. Present work consists of determining the effect of moisture content at harvest and of the effect of combine adjustment on milling yields.

The Institute of Science and Technology of the University of Arkansas in cooperation with the Agricultural Experiment Station are setting up a research project tying together varieties, harvesting, conditioning, fertilizer effect, and milling equipment with head rice turn out.

The Rice Growers Cooperative is doing some interesting work on the ventilation of stored rice. Results look favorable.

BRIEF REPORT

by

William V. Hukill

Department of Agricultural Engineering
Ames, Iowa

In projects which are being carried on at Ames, Iowa, Kansas, and Illinois, we note that the rate of drying fully exposed samples is quite different than the rate of bulk drying. The drying rate of the kernels is not uniform throughout a bulk drier. We have been making measurements of exposed drying rate and applying them to indicate the varying drying rates in bulk driers. This has given a means of computing bulk drying rates. In laboratory work at Beaumont, exposed drying rates at various temperatures, humidities, and air velocities are being measured to apply the same methods to bulk rice drying.

BRIEF REPORT

by

C. M. Packard

Bureau of Entomology & Plant Quarantine

For a number of years we had a man in the rice area studying the problem of rice insects and their control. When CCC began to take over grains and make loans on grains, we found that they would have an insect problem. In cooperation with the Agricultural Engineers we carried on quite an extensive study to determine what could be done in protection of wheat and corn in long time storage. We found in the course of this work in cooperation with the Agricultural Engineers that wheat and corn can be stored successfully for many years without material loss of insects and other factors. Insect problems will be aggravated here because you have a higher degree of humidity and moisture. It will be possible to utilize the background of information to help in the insect problem of the Gulf Coast Area. We still have work going on under a Research Marketing Act through the Bureau of Entomology and Plant Quarantine. We should be able to use some of our background information that we have to help with rice storage problems as far as insects are concerned.

BRIEF REPORT

by

Art Cummings

Grain Branch - Production and Marketing Administration

CCC Board allocated \$225,000.00 for use in the corn belt for demonstrating different types of storage buildings, including different types of bins, floors, and ceilings. We found out, and it was brought before the PMA in Washington for the first time, that the corn belt was suffering a cut as high as \$.60 to \$.70 a hundred pounds because the farmer had no place to store his product. After we finished in the corn belt, we had a similar problem in the grain sorghum area. We hired Jack Bradshaw for a summer and winter to work on this problem. We got with the Texas Agricultural Experiment Station and set up an experiment on grain sorghums in Beeville, Texas. We were able to find out the type of storage that was needed. We ordered the kind of buildings needed so that we could store grain sorghums in that area.

We now have a need to support rice. In this area we want to find out how we can store rough rice. Not much work has been done in the way of handling rice for farm storage. We got with the State of Louisiana Experiment Station in Crowley, furnished them with a number of bins, and placed rice in them so that an experiment could be carried on to see how dry we would have to have the rice before it could be stored. We want to know what kind of milling rice this rice will produce. We want to know now what type of storage will be needed and how dry the rice should be. We hope that within another year we will know enough about storing rough rice on farms. What type of bins do you recommend? What type of drying or how dry do we have to have this rice before it can be stored on the farm. If there is anything that we can do to get research on how we can store rice on the farm at the present time, we will be accomplishing a lot. If we are to support price of grains on the farm, we will have to make the change without too much loss to the Government.

After Lunch the conference was resumed.

IDENTIFICATION AND LISTING OF PROBLEMS

LEWIS

Would it be possible to have the agencies here represented, Experiment Stations, USDA Agencies, and Research Agencies, jointly prepare something of significance to meet this problem of rice storage? This is a problem that the Commodity Credit Corporation is up against right now. We need something to put out that could be used by growers and Commodity Credit Corporation. Can a group of this sort pool all their knowledge to help on this problem?

WINTERS

I think that Dr. Lewis' question is pertinent. Following our meeting in Washington, immediately a letter went out to all agencies concerned to bring together special information that might serve the purpose on the storage problem. Something is definitely needed and work is being done on this problem.

LEWIS

The following is an outline of the work to be studied on the storage of rice:

I. Storage of rice - for loan

FARMER

A. on farm

B. shipping point

COMMERCIAL

Can rice be stored over a summer?

LONG

From the engineering standpoint, we think of this thing being broken down into four stages:

1. Kernel
2. Pilot size plant to study conditioning and storage
3. Farm conditioning and storage units
4. Commercial size conditioning and storage units

The logical procedure would be to start with the individual kernel and study its drying. This takes time. The second stage would be the pilot plant for conditioning and storage. The third would be a practical size farm conditioning and storage unit wherein the results of the first two studies could be applied. The fourth stage would be a study of the commercial size storage operations where we have larger size quantities in one unit. We know that conditions there are different than they are in smaller size farm storage. I doubt very much that we here in this meeting today can say that there is enough information to publish this year. We have enough information present on which to base research work this fall.

LEWIS

We have a problem! Someone needs to stick their neck out to get something done right away.

LONG

Mr. Cummings, could farmers build and would they want to build long-time storage plants this fall?

WALKER

Some Louisiana farmers are ready to build bins for long time storage at the present time. If bins were available, they would be ready to put them on the farms right now.

LONG

How much storage would they want to carry at the farm?

TAGGART

This would depend entirely on the market.

WALKER

The Experiment Station in Crowley is setting up a unit that will take care of all of our Experimental drying.

CUMMINGS

We need to construct storage that will take care of a number of years' crop of grain.

DAVIS

During the past season in Texas some of the farmers whom we talked with were very hesitant about putting in farm storage units for the reason that they could not get their rice to market because the buyers would not come out and look at it. Many times only one buyer would bid on the farmer's rice at his farm because the other buyers did not have time to go out to the farms and bid on it.

BOYT

The farmers in this section are arranging their own storage and are doing it at the various shipping points. It is my opinion that this is the best way to sell rice. We have very poor roads and the rice should be brought to the shipping points for storage. About 60% of the farmers in this area are tenants and only work one piece of land for approximately three years, then they move on.

TACGART

Cap Boyt, how would you keep account of individual farmer's rice by varieties?

BOYT

Keep it separate. However, quite a few farmers are agreeing to let us pool their rice together.

LEWIS

I think that all persons able to make contributions should make them.

WINTERS

Suppose Mr. Cummings does not want to wait until all this research is done and we bring together our present knowledge to help them?

LEWIS

I suggest that all agencies who have some information on this problem bring it together and put it in someone's hands who can digest it and put it together as it should be.

PACKARD

By analysis here (held up two publications on insect control) is what we can do with other grains. Now, we hope you can use this knowledge and apply it to rice.

WINTERS

Could not we make available manuscripts that have been published?

PACKARD

Only if we can say, "Here is what we do in Kansas, etc. Will it work on rice?"

LONG

What is Mr. Kramer's opinion? He has written a bibliography on Drying and Storage of rice.

KRAMER

The bibliography that Long speaks of pertains only to drying of rice. Would it be possible for a group such as this to sit down and draw the requirements needed to solve this problem? I would say definitely "No!" We are going to have to have some actual storage experience and have complete information on initial conditioning and milling of this rice, whether cleaned or uncleaned.

PACKARD

Haven't commercial operators stored rice for a period of time?

KRAMER

I do not know of any instance where this has been done.

PEACHELL

You take rough rice where you keep insect out and it will not deteriorate or spoil. I have kept it two and three years. Rough rice will keep over a period of years. Rice that is aged is better for cooking.

HUKILL

Cummings asked what kind of bin do you have to have and what moisture content do you wish to put in that bin?

BOLT

I have had considerable experience with sack storage over the summer and it can be done, but it is very expensive. We are treating most of our seed rice with Arasan and Spergon and we have found that most of the rice that has been treated with these two chemicals germinates good.

PACKARD

If you give us storage that is tight enough to hold fumigants, we will be willing to try it out, and I believe that it can be done.

LONG

Engineers can contribute. We know how to build tight bins.

MILLER

Farmers will have to have all answers before they are willing to take the chance of using what we suggest.

LEWIS

Is it feasible and advisable and should this group appoint a committee that will assemble the information that is available in connection with the storage of rice to help us in this problem?

LONG

If we do develop a Regional Project on rice conditioning and storage, we are going to have to have a technical committee set up operating on the administrative leadership of one of the three Directors of Experiment Stations that are here today. This technical committee is the logical group to get together to formulate the publication we have been speaking about.

GLOVER

I haven't said anything yet. I want to emphasize that I am not a research man. The Commodity Credit Corporation and the PMA have got to act. There is no alternative but to take the information we have until we can get better information and use it as a basis for the rest of our research work.

GLOVER

(Made the following motions:)

"I move that Dr. Lewis be authorized to appoint a committee for purposes of:

1. Receiving the major problems affiliated with the conditioning and storage of rice.
2. Determining those problem areas where research by the several State and Federal agencies may have advanced far enough to permit at least a tentative statement of essential and feasible techniques and equipment.
3. To prepare such a statement outlining those feasible conditioning and storage techniques and equipment essential to the maintenance of high milling and germination properties in rice.

4. To indicate unsolved problems relating to essential handling of storage of carryover rice.

This statement would be submitted to ARA. After such limited technical review as may seem desirable in Washington and the States, the statement would be provided to the CCC (PMA) for its guidance in connection with its action programs. In using such information, however, the CCC (PMA) must make it definitely clear that the conclusions are based upon preliminary research not yet completed which are being applied in the interim, until definite results are obtained from continued research, because they represent the best, though incomplete, knowledge available at this time.

The committee would be composed of representatives from:

1. Interested State Experiment Stations
2. Interested agencies of the U. S. Department of Agriculture including BPI, Entomology, and BAIC.

After analyzing current problems in conditioning and storage of rice and evaluating the status of current research, the committee may outline overall framework for a long range regional research project in which the several States and Federal agencies would make their contributions in specified phases of the research field.

LONG

I second the motion made by Mr. Glover, however, could not this motion be recorded so as to say that this be the first consideration of a technical committee?

LEWIS

I doubt whether we have come quite to this. I am opposed to the suggestion. I think that the Experiment Stations concerned will want to know a little more than they do right now before entering into an agreement.

LONG

I would like to withdraw my suggestion.

WINTERS

Isn't it possible to bring together such information that we have that would be helpful in this situation that could give some safe advice for the basis of other studies? I would like to have a show of hands of all folks that will be willing to help. (Majority of hands raised.)

PACKARD

I think that the fellows who prepared the two bulletins "Storage of Shell Corn and Small Grain in the Ever Normal Grainery" and "Storage of Bar Corn in the Ever Normal Grainery" and these men were Dr. R. T. Cotton and Mr. William V. Hukill with the aid of Dr. C. K. Shedd might be best suited to see if these bulletins could be adopted to rice. Then they should submit a manuscript to the States represented here to get their opinion on it and then if it was approved by them a bulletin could be published.

WINTERS

Do you have any estimate of the length of time that it would take to get this manuscript together?

HUKILL

The problem of rice storage is foreign to most of the work that has gone into the bulletins mentioned. I would not like to assemble a manuscript since I have not had any experience on the subject. We would be glad to work with someone who has had more experience.

WINTERS

You would like to select phases of your work and let those who have had greater experience in this work prepare the first draft of the manuscript. I would like to have some suggestions as to who would be best suited for this work.

HUKILL

I suggest Messrs. Kramer, Sorenson, and Mr. Engler along with some entomologists who have had experience be assigned the job of preparing the first draft of the manuscript.

CUMMINGS

I would like to suggest that it be short and written in a language where farmers can read it and understand it. We want the farmers to know what we are talking about.

DAVIS

On the committee, how about limiting it to one representative of each division. I think maybe Agronomy should also be represented.

WINTERS

I think that is a good suggestion. What would you say to asking Dr. Lewis, who suggested this question, be the one to appoint the Committee to prepare this manuscript. All in favor say "aye"; all opposed, "no". (All were in favor of Mr. Winters' suggestion.)

LOVE

I again second the motion made by Mr. Glover to do this work. (The motion was unanimously passed.)

TEAS

I suggest that each agency or a representative of each agency submit what they think to be the most important information bearing on this problem. Actually we will call upon all of you to help this committee. I would suggest that the committee come out with something written in detail at first and then as Cummings stated the final manuscript should be much shorter.

WINTERS

In protection of these research men, I think that we should bring together the best possible information that we have.

LOVE

Let us return to the question of listing what we think are the most important problems for research.

SORENSEN

I happen to have some notes of the meeting held in New Orleans over a year ago. Some of the problems suggested then that needed working on are still problems. The following is the list of problems given at that meeting. (See Sorenson's brief report.)

ALTSCHUL

I believe there is a big need for fundamentals of the physiological behavior of rice. (At this point Dr. Altschul made brief comments on some of the work being done at the Southern Regional Research Laboratory.)

BARR

What happens to the rice grain itself, entomologically, pathologically, physiologically?

HUCKILL

Since the meeting a year ago, I have had our attention called particularly to the installations at Stuttgart. Problem of getting air through is primarily an engineering problem.

PACKARD

Suggested as problems: (1) The effect of drying at different temperatures on insect infestation with different degrees of moisture content. (2) The development of proper dosages of fumigants of this type of storage. (3) Methods in the application of fumigants, and (4) the best kind of fumigants.

DAVIS

Is there any problem on rodent control?

FAIRBART

You don't need any research on this.

DAVIS

Are we going to store any of this rice in sacks?

LONG

We are looking forward to setting up systems of conditioning and storing rice on the farm.

BRADSHAW

We do not want to forget the commercial man.

WINTERS

I would like to see us try to help the growers.

INGLIS

Are we assuming that the rice should be held through the summer as rough rice? If so, are we assuming that buyers of rice are going to take advantage of the farmers and not give them a good price? (We have no record of these questions being answered.)

SHORT RECESS AT 4:20 p.m. WAS CALLED BY DIRECTOR LEWIS.

I would like to call on Dr. Winters to give us a statement of a coordinated program in the hopes that he can tell us where to go from here.

WINTERS

We would like to bring down our personnel and resources and pool them in order to help out the program here on the problems of rice. I have listened rather closely to find out the scope. I have seen many phases of the program. We are all interested in drying. I have heard proposals for control of drying, control of storage, types of bins based upon small and large bins, differences of humidity and questions of pre-treatment. It isn't a matter of how we can eliminate but how we can find the answers to the problems with which we are faced. I think that quite a bit of the work will be supplemental but find no evidence of duplication of effort. We are strong in engineering but weak in plant physiology. I am convinced that we have adequately taken care of the physiological phases. In Washington we got together the various interests and we have had wonderful cooperation from Mr. Cummings, Mr. Wallace Ashby, Mr. Lang, and others. They all agreed that they are willing to help solve this problem. The success of this meeting has been due largely to Dr. Lewis' work in getting the Agenda together. How can we set up here a continuing collaboration of presenting our information and publications in more detail? How can we periodically get together and collaborate? How can we get together to know each other's progress? How can we get together for joint planning each year? Can we set up a continuing collaboration of this kind? The purpose of this meeting is not to change anyone's program but to get together and combine all our knowledge so that we can solve our problem. How can we develop and continue collaboration and continue planning with three States and the Bureaus concerned?

In establishing a Committee, we will avoid independent planning.

LEWIS

All of us are desirous of joint planning. This is shown by the joint projects already in operation. What is the feeling of this group? Are you in favor of joint analysis, reporting, surveying, and joint planning?

ENGLE

As long as it does not interfere with work we are planning ourselves.

MARGART

We do not want to be tied down where we cannot do what the farmers want us to do.

LEWIS

I don't think joint action means what you have stated. We certainly can make suggestions through this procedure of certain things that are not being done. Is it generally agreed with all of you present that we engage in joint planning?

WINTERS

Such a collaboration will not tell any State or Agency what they are to do, only it will tie the information which they have together.

MR. LONG READ A REVISED DRAFT OF A PAPER SUBMITTED BY WALLACE ASHBY.

ACTION TAKEN

This draft has been given to the Directors of the Arkansas, Louisiana, and Texas Agricultural Experiment Stations to review and submit comments and suggestions.

LONG

I make a motion that this group propose to the Southern Directors that they set up a rice technical committee.

ACTION TAKEN

Dr. Johnston seconded the motion and it was unanimously agreed upon.

ALTSCHUL

We are not cutting out the physiological phase of rice from anyone else. If anyone else would like to conduct work on this phase, it will be perfectly all right with us.

DAVIS

We might want to make some variation in our approach to whether it is going to be rice storage for loaning and milling purposes or whether it is going to be stored for farmers for their own use.

Director Lewis then, at 5:45 p.m., adjourned the meeting. Two separate night meetings were held at 7:30 p.m.; one dealing with drying and storage of sorghum and the other with technical aspects from the pathological and physiological approach on rice storage problems. Notes were taken at the sorghum section but not at the other. Notes on the Sorghum section are as follows:

A conference to discuss sorghum grain drying and storage investigations was held at 7:30 p.m. June 6, 1949, at Beaumont, Texas. The primary object of this meeting was to discuss the cooperative experiments of the Texas Agricultural Experiment Station and federal agencies.

Persons attending were:

R. D. Lewis, Texas Agri. Exper. Sta., College Station, Texas
R. Y. Winters, ARA, Washington, D. C.
J. Dewey Long, BPISAE, Beltsville, Maryland
W. V. Hukill, BPISAE, Ames, Iowa
John Kimberly, PMA, Washington, D. C.
Art Cummings, PMA, Washington, D. C.
Earl R. Glover, PMA, Washington, D. C.
J. R. Adams, State Committee, PMA, LaFeria, Texas
Jack Bradshaw, PMA, College Station, Texas
H. G. Johnston, A. & M. College, College Station, Texas
Ralph M. Weihing, Rice-Pasture Exper. Station, Beaumont, Texas, (USDA)
R. H. Wyche, Rice-Pasture Exper. Station, Beaumont, Texas
J. W. Sorenson, Texas Agri. Exper. Sta., College Station, Texas

Dr. Lewis reviewed the work done by the Texas Station on sorghum grain drying and storage. This included the drying tests reported in Progress Report 1070, "Drying Hay and Grain in Texas - 1946", the drying tests conducted at Corpus Christi in 1947 and the drying and storage studies underway at the Beeville Station. It was pointed out that drying and storage investigations were being conducted under RM Project 599, "Drying and Storing Sorghum Grain, Hay and Other Farm Crops." The tests at Beeville were set-up as a cooperative agreement between the Texas Agricultural Experiment Station and "Storing Sorghum Grain in the Gulf Coast Area of Texas." The Production and Marketing Administration and Commodity Credit Corporation provided funds to enable personnel of the Texas Station to conduct this research.

Dr. Lewis asked for opinions from representatives of the BPISAE as to how they could fit into the program at the Beeville Station.

It was the opinion of Mr. Hukill that basic engineering data to establish the drying rates or engineering constants that apply to bulk drying was one of the greatest needs at the present time. Hukill stated that this information had been determined for some grains and that he would like to follow through with other grains as soon as possible.

It was decided by those present that studies as outlined by Hukill would in no way duplicate the work done previously or in progress at the Texas Station. This group was also of the opinion that this information was needed for proper design of farm grain driers.

Dr. Winters suggested that a project be prepared in detail and submitted to the Texas Station for comments before any cooperative agreement was made. Long and Hukill agreed to prepare a tentative cooperative project outlining the proposed research.

Dr. Lewis expressed the opinion that there were plenty of opportunities for basic studies on drying and storage and also for storage studies in the High Plains area of Texas. Lewis welcomed the cooperation of BPISAE emphasizing the importance of setting up a program that would build on to what has been done and moving forward with new work.

Other lines of research were suggested as follows:

1. Design and construction of efficient low-cost farm storage units from the standpoint of preservation and ease of feeding on the farm.
2. Design, construction and arrangement of bins for commercial storage.
3. Possibility of using counter-flow type drier.
4. Drying rates for different varieties.

On June 9, 1949, Messrs. Hukill, Sorenson and Bradshaw met with Mr. R. A. Hall, Superintendent of the Beeville Station and M. G. Davenport assistant agricultural engineer in charge of the grain storage work at the Station, to discuss cooperative research contemplated by BPISAE. Hall and Davenport agreed that basic engineering data were needed. It was decided that the logical procedure to follow in a project of this nature would be to follow up laboratory studies with a practical application to farm size units. Mr. Hall outlined the facilities available at the Beeville Station. He expressed his interest in the work and his desire to cooperate in every way possible by providing space for equipment and grain for the tests. Mr. Bradshaw stated that PMA would be glad to assist in any way they could fit into the program.

This report was prepared by Mr. J. W. Sorenson, Jr., on June 17, 1949.

One unrecorded suggestion was made at the day meeting to the effect that rice drying and storage projects of all agencies be assembled so that all might become familiar with work in progress throughout the region.

